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Visual Aid Needs/Requirements: LCD projection

Vision-based Pedestrian Detection in Road Environments*

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Abstract

For a vision system installed on-board of a road vehicle to be able to assist the driver not only during highway driving but also within urban environments, besides the need for recognizing obstacles, the ability of detecting pedestrians is essential to avoid dangerous traffic situations. The recognition of human shapes can be of help not only for driving assistance purposes, but also on board of generic autonomous robots moving into an urban scenario for military purposes or humanitarian missions.

This work presents the vision-based system for detecting pedestrians in road environments implemented on the ARGO prototype vehicle developed by the University of Parma. The system is aimed at the localization of pedestrians in various poses, positions and clothing, and is not limited to moving people.

Initially, attentive vision techniques relying on a search for specific characteristics of pedestrians such as vertical symmetry and strong presence of edges, allow to select interesting regions likely to contain pedestrians. Then, such candidates areas are validated verifying the actual presence of pedestrians by means of a shape detection technique based on the application of autonomous agents (ants). The system was tested on the images acquired by the vision system installed on-board of the ARGO vehicle. The candidate selection procedure proved to be a robust technique for focusing the attention on interesting regions. From the first preliminary results, the ant-based processing appears to be a promising method for detecting the contour of a human shape.

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